

PSYC 353: Advanced Topics in Research Methods: Psychophysiology

Spring 2009

Tuesdays and Thursdays 11:00-12:15 PM

Clough Hall, Room 123

Instructor: **Jeffrey Sable, Ph.D.**
E-mail (see note): **sablej@rhodes.edu**

Office: Clough Hall, Room 110
Office phone: 843-3985

Note about e-mail: Although I may sometimes respond to e-mails quickly, this will not always be the case. Please be aware that there may be days and even whole weekends when I am not able to respond to e-mails.

Moodle: We will use the Rhodes Moodle website for this course (go to <https://moodle.rhodes.edu/clogin.php> to login). I plan to put all course materials (including this syllabus) on the site, and there will be a forum to facilitate class-wide communication and discussion outside of class. Please check the site regularly.

Office hours: By appointment. I am very often in my office or lab, so feel free to stop by, but it's a good idea to confirm a specific time ahead of time to ensure I'll be available. I'm glad to meet with you outside of class, individually or as a group. Please do not hesitate to come talk with me about the class (or other things). I enjoy discussing material outside of class.

Course structure: The course will include both lecture/discussion, based largely on assigned readings, and laboratory demonstrations and activity—a lot of activity. This will be a very intensive and hands-on course, meaning it is very important for you to be actively involved in discussions and demonstrations. **ASK A LOT OF QUESTIONS!** Work will be required both during the scheduled class times and beyond the scheduled class times to setup, acquire, and analyze data.

If you think you may need any kind of accommodation in this class, please contact me no later than Friday, January 23, to discuss possibilities.

Course catalog description for PSYC 353: “Students will gain practical experience recording and analyzing human brain activity and bodily responses.”

Prerequisites: Psychology 200, 211, and 318, and permission of the instructor.

*NOTE: Although we will try to stick to what is outlined,
the details of this syllabus are subject to change, if necessary.*

Psychophysiology refers to a diverse group of related methods by which physiological responses are measured as they relate to psychological events and processes. Psychophysiology is most strongly associated with the measurement of changes in electrical activity. This includes brain activity (EEG, ERPs), but it also includes many other measures, including EDA (skin), EKG (heart), and EMG (muscle). While the measurement of electrical changes will be the focus of this course because of its relative accessibility, psychophysiology also includes methods such as MEG, NIRS, fMRI, and PET. The basic structure of the data (vectors and matrices of numbers) is similar across all of these methods, and the data processing techniques that you learn in this class are generalizable to all of the methods.

By the end of the course, you should:

1. Have a basic knowledge and understanding of psychophysiological principles, methods, and terms, such that you are able to understand research literature and scientific presentations that include psychophysiology.
2. Be able to design scientific studies that use psychophysiological methods and report the details and results of such studies in written and oral form.
3. Be able to critically evaluate the work of others who have conducted scientific research using psychophysiological methods.

Required Textbook:

Andreassi, J. L. (2007). *Psychophysiology: Human behavior and physiological response* (5th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Journal Articles: Several recent journal articles will be assigned to expose you to primary research literature in the field and to think critically about it. These will generally be posted on Moodle.

Additional Materials Available in the Library:

Cacioppo, J.T., & Tassinari, L. G. (Eds.) (1990). *Principles of psychophysiology: Physical, social, and inferential elements*. Cambridge: Cambridge University Press.

Cacioppo, J. T., Tassinari, L. G., & Berntson, G. G. (Eds.) (2007). *Handbook of psychophysiology* (3rd ed.). Cambridge: Cambridge University Press.

Coles, M.G.H., Donchin, E., & Porges, S.W. (Eds.) (1986). *Psychophysiology: Systems, processes, and applications*. New York, Guilford Press.

Hugdahl, K. (2001). *Psychophysiology: The mind-body perspective*. Boston: Harvard University Press.

Stern, R. M., Ray, W. J., & Quigley, K. S. (2000). *Psychophysiological recording* (2nd ed.). Oxford: Oxford University Press.

Attendance

It's a good thing. I will not give points for attendance, per se, but attendance will definitely affect your grade—both for scheduled class periods and for lab work scheduled outside of class. We will be dependent on each other for getting things done this semester. *Please avoid leaving the room in the middle of class!* This is very disruptive and you may miss something important. Also, please do not use cell phones or other electronic equipment in class or while working in the lab. I understand that a laptop may be helpful at times, but please be respectful of others. Also, I may ask you to use your computer for class purposes (e.g., look something up for us).

I have a simple rule about make-ups: **If you miss a test or an assignment due time, and you haven't made alternative arrangements with me in advance, you get a ZERO on it.** This includes in-class points. Unless otherwise indicated, all assignments are due at the **beginning** of class. If you have to miss class, let me know in advance (as early as possible) and we'll see if we can make other arrangements.

Academic dishonesty

Don't cheat. It's stupid. Very bad things can happen. If you're having problems, come talk to me. **All work in this course is pledged.** Details of the Honor System at Rhodes are in the Student Handbook, including what constitutes a violation. **Don't plagiarize!!** Essentially, this is copying someone else's ideas or work. Two things can go a long way toward avoiding plagiarism: (1) don't copy and (2) give credit if it's someone else's idea (including properly formatting and acknowledging direct quotes). This is a good practice in general, even in conversation (i.e., acknowledging someone else's ideas as you are talking is a good way to get brownie points). ***If you use someone else's ideas, you MUST give them credit!*** Ask me if you're not sure about the proper way to format or give credit.

Tentative Schedule

The course will begin with an intensive introduction to psychophysiology, consisting of (1) lecture/discussion, based largely on assigned readings, and (2) demonstrations of the recording and analysis of several of the most common psychophysiological measures. In parallel, you will be expected to examine the psychophysiological literature in search of a potential topic for the course research project (starting with your text and material on reserve in the library and progressing to scientific journals, such as *Psychophysiology*). It will most likely be necessary to go beyond Rhodes in the pursuit of information. You will be required to submit an individual research proposal, which will include a short literature review, a specific hypothesis, a brief description of potential methods to test your hypothesis, and anticipated results. As a group, we will choose one or two proposals (or perhaps a hybrid of proposals) that are the most feasible for us. The selected proposal(s) will serve as the basis for the research we will conduct for the remainder of the semester (either as a single group or in two smaller groups). It will be necessary for us (you) to obtain IRB approval for the research, and to recruit other students to serve as research participants. The majority of class effort will be devoted to completing an entire research project (or research projects) from start to finish. Each project will culminate in a final group paper, written as a manuscript for submission to the journal, *Psychophysiology* (APA format). Your final for the course will be a group presentation (defense) of your research. In addition, the project(s) will be presented at the Undergraduate Research and Creative Activity Symposium (URCAS). Depending on the outcome and quality of the research, we may also consider (1) submitting the manuscript(s) for publication in a scientific journal (e.g., *Psychophysiology*), and (2) submitting the work in abstract form to an appropriate scientific meeting (e.g., the Society for Psychophysiological Research). This will be an intensive collaborative research effort involving you, your fellow classmates, and me. If you attend graduate school, you may have a “first year project” experience that is similar in some ways (although you will likely have *less* input in that case).

Day	Date	Topic	Reading assignments
Thu	Jan. 15	Introduction	
Tues	20	Electroencephalography (EEG)	Andreassi p. 1-12, 43-63; TBD journal article (Q/C)
Thu	22	EEG demo	
Tues	27	Event-related potentials (ERPs)	Andreassi p. 122-132; TBD journal article (Q/C)
Thu	29	ERP demo	
Tues	Feb. 3	Electromyography (EMG)	Andreassi p. 229-239; TBD journal article (Q/C)
Thu	5	EMG demo	
Tues	10	Electrodermal activity (EDA)	Andreassi p. 259-267; TBD journal article (Q/C)
Thu	12	EDA demo	
Tues	17	Electrocardiography (EKG)	Andreassi p. 336-346; TBD journal article (Q/C)
Thu	19	EKG demo	
TR	24, 26	Work on proposals; First draft due by Thursday at 5:00 (e-mail to everyone)	
TR	Mar. 3, 5	Individual proposal presentations and discussion	
Tues	10	Final proposals due ; discuss and decide on a topic	
Thu	12	Design, preparation, IRB proposal, and URCAS abstract	
TR	17, 19	Spring Break, no class	
TR	24, 26	Research setup and testing, collect and analyze pilot data; URCAS abstract due by 2/25	
Tues	31	Collect and analyze pilot data	
	April 1-8	Run participants and analyze data	
	9, 10	Easter Break, no class	
	13-17	Run participants and analyze data	
	20-24	Statistical analysis and results	
Tues	28	Work on manuscript(s) and poster(s)	
Thu	30	Final manuscript(s) and poster(s) due	
Fri	May 1	Undergraduate Research & Creative Activity Symposium (URCAS)	
Wed	6	Final Exam, 8:30 AM	

Important Dates to Note

01.13.2009	Enrollment Clearance
01.14.2009	Classes Begin
01.19.2009	Martin Luther King, Jr. Day – No classes
01.21.2009	Drop/Add Period Ends
01.22.2009	Extended Drop Period Begins
02.04.2009	Pass/Fail Option Ends
02.04.2009	Extended Drop Period Ends
02.05.2009	Withdraw Period Begins
02.11.2009	Last Day to Remove Conditional Grades
03.04.2009	End of First Seven Weeks Classes
03.09.2009 – 9:00 am	Mid-Term Grades Due
03.13.2009 – 5:00 pm	Spring Recess Begins
03.23.2009	Classes Resume
03.27.2009	Withdraw Period Ends
04.08.2009 – 10:00 pm	Easter Recess Begins
04.13.2009	Classes Resume
05.01.2009	URCAS Awards Convocation Classes End
05.02.2009	Reading Day
05.04.2009	Final Examinations Begin
05.07.2009	Reading Day 2
05.09.2009	Final Examinations End
05.11.2009 – 9:00 am	Final Grades Due
05.15.2009 – 3:00 pm	Baccalaureate Service
05.16.2009 – 9:30 am	Commencement

Grading

1. **Participation in the research project (10%)**
2. **Individual research proposal (40%):** As scientists, we are detectives. We are each here to identify and solve a mystery. As you think about what we should do, remember this: BABY STEPS. It would be really exciting to come up with something grand and dramatic. Realistically, though, that's probably unrealistic. Think along the lines of a subtle twist, something simple and small, but clear and elegant. More details will be forthcoming about how your paper will be evaluated, but keep in mind that this is essentially a competition, so be clear and concise. Also keep in mind that you are not just writing for me, but for your fellow student research collaborators in the class, as well as potentially for people who will be reviewing your manuscript to decide whether or not it will be published. Also keep in mind that the draft should be in close to final form. Any changes you make from this point should be to strengthen the paper based on our class discussions and questions and feedback you receive. Your peers' feedback on the *draft* will influence your grade on the final version.
 - Length: 4-7 pages (not including title page, abstract, and references)
 - Formatted for *Psychophysiology* (APA style)
 - Sections
 - *Title page*
 - *Abstract*
 - *Introduction*: Tell the story of your project.
 1. Start by getting our attention: Why should we choose your project?
 2. Present the evidence: What is the mystery? What evidence (data) do you have? What is the missing link?
 3. State your **hypothesis**: Very briefly, how do you propose to solve the mystery? Based on the evidence, what do you think is the solution to the mystery?
 - *Material and Methods*: Now that you have our attention, exactly how do we solve the mystery? Clearly state the **variables**. You MUST be thorough!! If you are not clear, you have failed your mission and we cannot continue on our quest. THE ISSUE HERE IS NOT QUANTITY, BUT QUALITY!! YOUR EXPLANATION MUST BE CLEAR!
 - *Anticipated results*: You showed us the trailer in the introduction. Now tell us how you think the outcome of the test (i.e., the values and variance in the measured variables) will support your hypothesis.
3. **Feedback on proposal drafts (10%):** You should e-mail your proposal draft to the entire group by the due date and time. Around the same time you will be receiving the proposals from everyone else, to read and to provide feedback. It is very important to take this responsibility seriously and to give constructive feedback on each proposal. This means that you will be getting feedback from everyone in the class to help improve the final version of your paper.
4. **Group write-up (i.e., manuscript) of the research project (and the URCAS poster) (20%)**
 - The "winning" proposal(s) will serve as the foundation for this paper. This is the real thing. You write a manuscript with the intention of submitting it for publication.
 - Formatted for *Psychophysiology*
5. **Group presentation (final exam) (20%):** This is basically a defense of your research. Don't succumb to social loafing. Even though you will be presenting as a group, you will be graded individually. I (and others who may attend the final) will very likely ask questions specifically of you (yes, YOU) to assess your knowledge and understanding of the project.

Note that your performance will be assessed by both me and your peers. You will evaluate each others' work and contributions.